

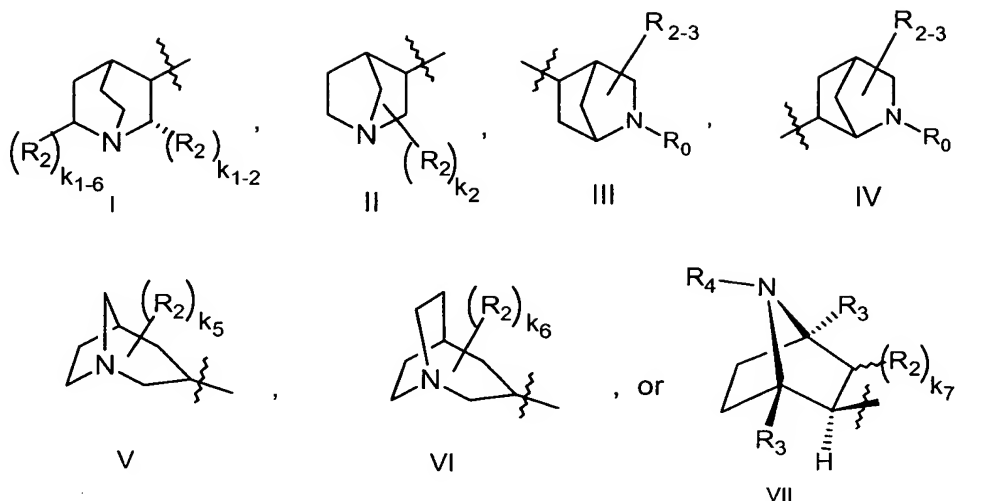
## Claims:

1. A method to treat disease or disorder involving cholinergic hypofunction in a mammal in need thereof administering an effective amount of an  $\alpha 7$  nAChR full agonist over an effective therapeutic interval with at least one inhibitor, wherein the inhibitor is a beta secretase inhibitor, an acetylcholinesterase inhibitor, and a gamma secretase inhibitor.
2. The method of claim 1, wherein the Acetylcholinesterase inhibitor is physostigmine, aricept, rivastigmine, galantamine, monoamine acridines and derivatives, piperidinyl-alkanoyl heterocyclic compounds, N-benzyl-piperidine derivatives, 4-(1-benzylpiperidyl)-substituted fused quinoline derivatives, and cyclic amide derivatives.
3. The method of claim 1, wherein the disease or condition is cognitive and attention deficit symptoms of Alzheimer's, neurodegeneration associated with diseases such as Alzheimer's disease, pre-senile dementia (mild cognitive impairment), senile dementia, amyotrophic lateral sclerosis, traumatic brain injury, behavioral and cognitive problems in general and associated with brain tumors, AIDS dementia complex, dementia associated with Down's syndrome, dementia associated with Lewy Bodies, Huntington's disease, Parkinson's disease, age-related macular degeneration.
4. The method of claim 1, wherein the mammal is a human.
5. The method of claim 1, wherein the alpha 7 nAChR full agonist is a compound of Formula I:



Formula I

wherein Azabicyclo is



wherein X is O, or S;

R<sub>0</sub> is H, lower alkyl, substituted lower alkyl, or lower haloalkyl;

Each R<sub>1</sub> is H, alkyl, cycloalkyl, haloalkyl, substituted phenyl, or substituted naphthyl;

Each R<sub>2</sub> is independently F, Cl, Br, I, alkyl, substituted alkyl, haloalkyl, cycloalkyl, aryl, or R<sub>2</sub> is absent provided that k<sub>1-2</sub>, k<sub>1-6</sub>, k<sub>2</sub>, k<sub>5</sub>, k<sub>6</sub>, or k<sub>7</sub> is 0;

k<sub>1-2</sub> is 0 or 1;

k<sub>1-6</sub> is 0 or 1, provided that the sum of k<sub>1-2</sub> and k<sub>1-6</sub> is one;

k<sub>2</sub> is 0 or 1;

k<sub>5</sub> is 0, 1, or 2;

k<sub>6</sub> is 0, 1, or 2;

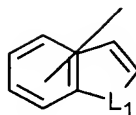
k<sub>7</sub> is 0 or 1;

R<sub>2-3</sub> is H, F, Cl, Br, I, alkyl, haloalkyl, substituted alkyl, cycloalkyl, or aryl;

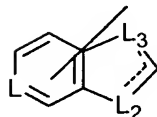
Each R<sub>3</sub> is independently H, alkyl, or substituted alkyl;

R<sub>4</sub> is H, alkyl, an amino protecting group, or an alkyl group having 1-3 substituents selected from F, Cl, Br, I, -OH, -CN, -NH<sub>2</sub>, -NH(alkyl), or -N(alkyl)<sub>2</sub>;

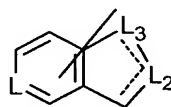
R<sub>5</sub> is 5-membered heteroaromatic mono-cyclic moieties containing within the ring 1-3 heteroatoms independently selected from the group consisting of -O-, =N-, -N(R<sub>10</sub>)-, and -S-, and having 0-1 substituent selected from R<sub>9</sub> and further having 0-3 substituents independently selected from F, Cl, Br, or I, or R<sub>5</sub> is 9-membered fused-ring moieties having a 6-membered ring fused to a 5-membered ring and having the formula



wherein  $L_1$  is O, S, or  $NR_{10}$ ,



wherein L is  $CR_{12}$  or N,  $L_2$  and  $L_3$  are independently selected from  $CR_{12}$ ,  $C(R_{12})_2$ , O, S, N, or  $NR_{10}$ , provided that both  $L_2$  and  $L_3$  are not simultaneously O, simultaneously S, or simultaneously O and S, or



wherein L is  $CR_{12}$  or N, and  $L_2$  and  $L_3$  are independently selected from  $CR_{12}$ , O, S, N, or  $NR_{10}$ , and each 9-membered fused-ring moiety having 0-1 substituent selected from  $R_9$  and further having 0-3 substituent(s) independently selected from F, Cl, Br, or I, wherein the  $R_5$  moiety attaches to other substituents as defined in formula I at any position as valency allows;

$R_6$  is 6-membered heteroaromatic mono-cyclic moieties containing within the ring 1-3 heteroatoms selected from =N- and having 0-1 substituent selected from  $R_9$  and 0-3 substituent(s) independently selected from F, Cl, Br, or I, or  $R_6$  is 10-membered heteroaromatic bi-cyclic moieties containing within one or both rings 1-3 heteroatoms selected from =N-, including, but not limited to, quinolinyl or isoquinolinyl, each 10-membered fused-ring moiety having 0-1 substituent selected from  $R_9$  and 0-3 substituent(s) independently selected from F, Cl, Br, or I, wherein the  $R_6$  moiety attaches to other substituents as defined in formula I at any position as valency allows;

$R_7$  is alkyl, substituted alkyl, haloalkyl,  $-OR_{11}$ ,  $-CN$ ,  $-NO_2$ ,  $-N(R_8)_2$ ;

Each  $R_8$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from  $R_{13}$ , cycloalkyl substituted with 1 substituent selected from  $R_{13}$ , heterocycloalkyl substituted with 1 substituent selected from  $R_{13}$ , haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;

$R_9$  is alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl,  $-OR_{14}$ ,  $-SR_{14}$ ,  $-N(R_{14})_2$ ,  $-C(O)R_{14}$ ,  $-C(O)N(R_{14})_2$ ,  $-CN$ ,  $-NR_{14}C(O)R_{14}$ ,  $-S(O)_2N(R_{14})_2$ ,  $-NR_{14}S(O)_2R_{14}$ ,  $-NO_2$ , alkyl substituted with 1-4 substituent(s) independently selected from F, Cl, Br, I, or  $R_{13}$ , cycloalkyl substituted with 1-4 substituent(s) independently selected from F, Cl, Br, I, or  $R_{13}$ , or heterocycloalkyl substituted with 1-4 substituent(s) independently selected from F, Cl, Br, I, or  $R_{13}$ ;

$R_{10}$  is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, phenyl, or phenyl having 1 substituent selected from  $R_7$  and further having 0-3 substituents independently selected from F, Cl, Br, or I;

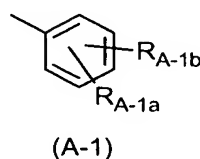
Each  $R_{11}$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

Each  $R_{12}$  is independently H, F, Cl, Br, I, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted cycloalkyl, substituted heterocycloalkyl,  $-CN$ ,  $-NO_2$ ,  $-OR_{14}$ ,  $-SR_{14}$ ,  $-N(R_{14})_2$ ,  $-C(O)R_{14}$ ,  $-C(O)N(R_{14})_2$ ,  $-NR_{14}C(O)R_{14}$ ,  $-S(O)_2N(R_{14})_2$ ,  $-NR_{14}S(O)_2R_{14}$ , or a bond directly or indirectly attached to the core molecule, provided that there is only one said bond to the core molecule within the 9-membered fused-ring moiety, further provided that where valency allows the fused-ring moiety has 0-1 substituent selected from alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted cycloalkyl, substituted heterocycloalkyl,  $-OR_{14}$ ,  $-SR_{14}$ ,  $-N(R_{14})_2$ ,  $-C(O)R_{14}$ ,  $-NO_2$ ,  $-C(O)N(R_{14})_2$ ,  $-CN$ ,  $-NR_{14}C(O)R_{14}$ ,  $-S(O)_2N(R_{14})_2$ , or  $-NR_{14}S(O)_2R_{14}$ , and further provided that the fused-ring moiety has 0-3 substituent(s) selected from F, Cl, Br, or I;

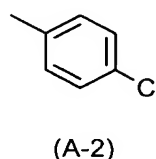
$R_{13}$  is  $-OR_{14}$ ,  $-SR_{14}$ ,  $-N(R_{14})_2$ ,  $-C(O)R_{14}$ ,  $-C(O)N(R_{14})_2$ ,  $-CN$ ,  $-CF_3$ ,  $-NR_{14}C(O)R_{14}$ ,  $-S(O)_2N(R_{14})_2$ ,  $-NR_{14}S(O)_2R_{14}$ , or  $-NO_2$ ;

Each  $R_{14}$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

wherein W is (A):



or



wherein  $R_{A-1a}$  is H, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, aryl,  $-R_5$ ,  $R_6$ ,  $-OR_{A-3}$ ,  $-OR_{A-4}$ ,  $-SR_{A-3}$ , F, Cl, Br, I,  $-N(R_{A-3})_2$ ,  
 5  $-N(R_{A-5})_2$ ,  $-C(O)R_{A-3}$ ,  $-C(O)R_{A-5}$ ,  $-CN$ ,  $-C(O)N(R_{A-3})_2$ ,  $-C(O)N(R_{A-6})_2$ ,  
 $-NR_{A-3}C(O)R_{A-3}$ ,  $-S(O)R_{A-3}$ ,  $-OS(O)_2R_{A-3}$ ,  $-NR_{A-3}S(O)_2R_{A-3}$ ,  $-NO_2$ , and  
 $-N(H)C(O)N(H)R_{A-3}$ ;

$R_{A-1b}$  is  $-O-R_{A-3}$ ,  $-S-R_{A-3}$ ,  $-S(O)-R_{A-3}$ ,  $-C(O)-R_{A-7}$ , and alkyl substituted on the  
 $\omega$  carbon with  $R_{A-7}$ ;

10 Each  $R_{A-3}$  is independently selected from H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or substituted phenyl;

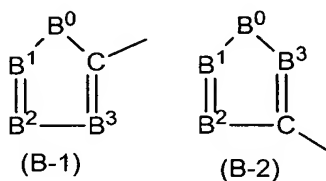
$R_{A-4}$  is selected from cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, or substituted heterocycloalkyl;

15 Each  $R_{A-5}$  is independently selected from cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or substituted phenyl;

Each  $R_{A-6}$  is independently selected from alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, halohetero-  
 20 cycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or substituted phenyl;

$R_{A-7}$  is selected from aryl,  $R_5$ , or  $R_6$ ;

wherein W is (B):



25 wherein  $B^0$  is  $-O-$ ,  $-S-$ , or  $-N(R_{B-0})-$ ;

$B^1$  and  $B^2$  are independently selected from  $=N-$ , or  $=C(R_{B-1})-$ ;

$B^3$  is  $=N-$ , or  $=CH-$ , provided that when both  $B^1$  and  $B^2$  are  $=C(R_{B-1})-$  and  $B^3$  is  $=CH-$ , only one  $=C(R_{B-1})-$  can be  $=CH-$ , and further provided that when  $B^0$  is  $-O-$ ,  $B^2$  is  $=C(R_{B-1})-$  and  $B^3$  is  $=C(H)-$ ,  $B^1$  cannot be  $=N-$ ,

$R_{B-0}$  is H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, limited substituted alkyl, substituted cycloalkyl, substituted heterocycloalkyl, or aryl, and provided that when B is (B-2) and  $B^3$  is =N- and  $B^0$  is N( $R_{B-0}$ ),  $R_{B-0}$  cannot be phenyl or substituted phenyl;

5  $R_{B-1}$  is H, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, limited substituted alkyl, limited substituted alkenyl, limited substituted alkynyl, aryl, -OR<sub>B-2</sub>, -OR<sub>B-3</sub>, -SR<sub>B-2</sub>, -SR<sub>B-3</sub>, F, Cl, Br, I, -N( $R_{B-2}$ )<sub>2</sub>,  
10 -N( $R_{B-3}$ )<sub>2</sub>, -C(O)R<sub>B-2</sub>, -C(O)R<sub>B-3</sub>, -C(O)N( $R_{B-2}$ )<sub>2</sub>, -C(O)N( $R_{B-3}$ )<sub>2</sub>, -CN, -NR<sub>B-2</sub>C(O)R<sub>B-4</sub>, -S(O)<sub>2</sub>N( $R_{B-2}$ )<sub>2</sub>, -OS(O)<sub>2</sub>R<sub>B-4</sub>, -S(O)<sub>2</sub>R<sub>B-2</sub>, -S(O)<sub>2</sub>R<sub>B-3</sub>, -NR<sub>B-2</sub>S(O)<sub>2</sub>R<sub>B-2</sub>, -N(H)C(O)N(H)R<sub>B-2</sub>, -NO<sub>2</sub>, R<sub>5</sub>, and R<sub>6</sub>;

Each  $R_{B-2}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl,  
15 substituted heterocycloalkyl, R<sub>5</sub>, R<sub>6</sub>, phenyl, or substituted phenyl;

Each  $R_{B-3}$  is independently H, alkyl, haloalkyl, limited substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl;

$R_{B-4}$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl,  
20 halocycloalkyl, or haloheterocycloalkyl;

wherein W is (C):

(C) is a six-membered heterocyclic ring system having 1-2 nitrogen atoms or a 10-membered bicyclic-six-six-fused-ring system having up to two nitrogen atoms  
25 within either or both rings, provided that no nitrogen is at a bridge of the bicyclic-six-six-fused-ring system, and further having 1-2 substituents independently selected from R<sub>C-1</sub>;

Each R<sub>C-1</sub> is independently H, F, Cl, Br, I, alkyl, haloalkyl, substituted alkyl, alkenyl, haloalkenyl, substituted alkenyl, alkynyl, haloalkynyl, substituted alkynyl,  
30 cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl, substituted phenyl, -NO<sub>2</sub>, -CN, -OR<sub>C-2</sub>, -SR<sub>C-2</sub>, -SOR<sub>C-2</sub>, -SO<sub>2</sub>R<sub>C-2</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-3</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-2</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-4</sub>, -N(R<sub>C-2</sub>)<sub>2</sub>, -C(O)R<sub>C-2</sub>, -C(O)<sub>2</sub>R<sub>C-2</sub>, -C(O)N(R<sub>C-2</sub>)<sub>2</sub>,

-SCN, -NR<sub>C-2</sub>C(O)R<sub>C-2</sub>, -S(O)N(R<sub>C-2</sub>)<sub>2</sub>, -S(O)<sub>2</sub>N(R<sub>C-2</sub>)<sub>2</sub>, -NR<sub>C-2</sub>S(O)<sub>2</sub>R<sub>C-2</sub>, R<sub>5</sub>, or R<sub>6</sub>;

Each R<sub>C-2</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from R<sub>C-5</sub>, cycloalkyl substituted with 1 substituent selected from R<sub>C-5</sub>, heterocycloalkyl substituted with 1 substituent selected from R<sub>C-5</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;

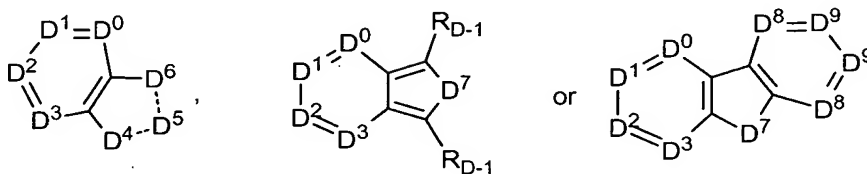
Each R<sub>C-3</sub> is independently H, alkyl, or substituted alkyl;

R<sub>C-4</sub> is H, alkyl, an amino protecting group, or an alkyl group having 1-3 substituents selected from F, Cl, Br, I, -OH, -CN, -NH<sub>2</sub>, -NH(alkyl), or -N(alkyl)<sub>2</sub>;

R<sub>C-5</sub> is -CN, -CF<sub>3</sub>, -NO<sub>2</sub>, -OR<sub>C-6</sub>, -SR<sub>C-6</sub>, -N(R<sub>C-6</sub>)<sub>2</sub>, -C(O)R<sub>C-6</sub>, -SOR<sub>C-6</sub>, -SO<sub>2</sub>RR<sub>C-6</sub>, -C(O)N(R<sub>C-6</sub>)<sub>2</sub>, -NR<sub>C-6</sub>C(O)R<sub>C-6</sub>, -S(O)<sub>2</sub>N(R<sub>C-6</sub>)<sub>2</sub>, or -NR<sub>C-6</sub>S(O)<sub>2</sub>R<sub>C-6</sub>;

Each R<sub>C-6</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

wherein W is (D):



provided that the bond between the -C(=X)- group and the W group may be attached at any available carbon atom within the D group as provided in R<sub>D-1</sub>, R<sub>D-3</sub>, and R<sub>D-4</sub>;

D<sup>0</sup>, D<sup>1</sup>, D<sup>2</sup>, and D<sup>3</sup> are N or C(R<sub>D-1</sub>) provided that up to one of D<sup>0</sup>, D<sup>1</sup>, D<sup>2</sup>, or D<sup>3</sup> is N and the others are C(R<sub>D-1</sub>), further provided that when the core molecule is attached at D<sup>2</sup> and D<sup>0</sup> or D<sup>1</sup> is N, D<sup>3</sup> is C(H), and further provided that there is only one attachment to the core molecule;

D<sup>4</sup>---D<sup>5</sup>---D<sup>6</sup> is selected from N(R<sub>D-2</sub>)-C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>), N=C(R<sub>D-3</sub>)-C(R<sub>D-4</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>)-N(R<sub>D-2</sub>), C(R<sub>D-3</sub>)<sub>2</sub>-N(R<sub>D-2</sub>)-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-4</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)=N, N(R<sub>D-2</sub>)-C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>-N(R<sub>D-2</sub>), O-C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>), O-C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)<sub>2</sub>-O-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>)-O, C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>-O, S-C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>), S-C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)<sub>2</sub>-S-C(R<sub>D-3</sub>)<sub>2</sub>, C(R<sub>D-3</sub>)=C(R<sub>D-3</sub>)-S, or C(R<sub>D-3</sub>)<sub>2</sub>-C(R<sub>D-3</sub>)<sub>2</sub>-S;

provided that when C(X) is attached to W at D<sup>2</sup> and D<sup>6</sup> is O, N(R<sub>D-2</sub>), or S, D<sup>4</sup>---D<sup>5</sup> is not CH=CH;

and further provided that when C(X) is attached to W at D<sup>2</sup> and D<sup>4</sup> is O, N(R<sub>D-2</sub>), or S, D<sup>5</sup>---D<sup>6</sup> is not CH=CH;

Each R<sub>D-1</sub> is independently H, F, Br, I, Cl, -CN, -CF<sub>3</sub>, -OR<sub>D-5</sub>, -SR<sub>D-5</sub>, -N(R<sub>D-5</sub>)<sub>2</sub>, or a bond to -C(X)- provided that only one of R<sub>D-1</sub>, R<sub>D-3</sub>, and R<sub>D-4</sub> is said  
5 bond;

Each R<sub>D-2</sub> is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, R<sub>5</sub>, or R<sub>6</sub>;

Each R<sub>D-3</sub> is independently H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>D-10</sub>, -C(O)N(R<sub>D-11</sub>)<sub>2</sub>, -NR<sub>D-10</sub>COR<sub>D-12</sub>, -N(R<sub>D-10</sub>)<sub>2</sub>, -SR<sub>D-10</sub>, -S(O)<sub>2</sub>R<sub>D-10</sub>, -C(O)R<sub>D-12</sub>, -CO<sub>2</sub>R<sub>D-10</sub>, aryl, R<sub>5</sub>, R<sub>6</sub>, a bond to -C(X)- provided that only one of R<sub>D-1</sub>, R<sub>D-3</sub>, and R<sub>D-4</sub> is said bond;  
10

Each R<sub>D-4</sub> is independently H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>D-10</sub>, -C(O)N(R<sub>D-11</sub>)<sub>2</sub>, -NR<sub>D-10</sub>COR<sub>D-12</sub>, -N(R<sub>D-11</sub>)<sub>2</sub>, -SR<sub>D-10</sub>, -CO<sub>2</sub>R<sub>D-10</sub>, aryl, R<sub>5</sub>, R<sub>6</sub>, a bond to -C(X)- provided that only one of R<sub>D-1</sub>, R<sub>D-3</sub>, and R<sub>D-4</sub> is said bond;  
15

Each R<sub>D-5</sub> is independently H, C<sub>1-3</sub> alkyl, or C<sub>2-4</sub> alkenyl;  
20

D<sup>7</sup> is O, S, or N(R<sub>D-2</sub>);

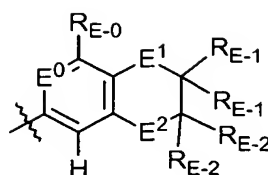
D<sup>8</sup> and D<sup>9</sup> are C(R<sub>D-1</sub>), provided that when the molecule is attached to the phenyl moiety at D<sup>9</sup>, D<sup>8</sup> is CH;

Each R<sub>D-10</sub> is H, alkyl, cycloalkyl, haloalkyl, substituted phenyl, or substituted naphthyl;  
25

Each R<sub>D-11</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from R<sub>13</sub>, cycloalkyl substituted with 1 substituent selected from R<sub>13</sub>, heterocycloalkyl substituted with 1 substituent selected from R<sub>13</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;  
30

R<sub>D-12</sub> is H, alkyl, substituted alkyl, cycloalkyl, haloalkyl, heterocycloalkyl, substituted heterocycloalkyl, substituted phenyl, or substituted naphthyl;

wherein W is (E):



$E^0$  is CH or N;

$R_{E-0}$  is H, F, Cl, Br, I, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, aryl,  $R_5$ ,  $R_6$ ,  $-OR_{E-3}$ ,  $-OR_{E-4}$ ,  $-SR_{E-3}$ ,  $-SR_{E-5}$ ,  $-N(R_{E-3})_2$ ,  $-NR_{E-3}R_{E-6}$ ,  $-N(R_{E-6})_2$ ,  $-C(O)R_{E-3}$ ,  $-CN$ ,  $-C(O)N(R_{E-3})_2$ ,  $-NR_{E-3}C(O)R_{E-3}$ ,  $-S(O)R_{E-3}$ ,  $-S(O)R_{E-5}$ ,  $-OS(O)_2R_{E-3}$ ,  $-NR_{E-3}S(O)_2R_{E-3}$ ,  $-NO_2$ , or  $-N(H)C(O)N(H)R_{E-3}$ ;

$E^1$  is O,  $CR_{E-1-1}$ , or  $C(R_{E-1-1})_2$ , provided that when  $E^1$  is  $CR_{E-1-1}$ , one  $R_{E-1}$  is a bond to  $CR_{E-1-1}$ , and further provided that at least one of  $E^1$  or  $E^2$  is O;

Each  $R_{E-1-1}$  is independently H, F, Br, Cl, CN, alkyl, haloalkyl, substituted alkyl, alkynyl, cycloalkyl,  $-OR_E$ , or  $-N(R_E)_2$ , provided that at least one  $R_{E-1-1}$  is H when  $E^1$  is  $C(R_{E-1-1})_2$ ;

Each  $R_{E-1}$  is independently H, alkyl, substituted alkyl, haloalkyl, cycloalkyl, heterocycloalkyl, or a bond to  $E^1$  provided that  $E^1$  is  $CR_{E-1-1}$ ;

$E^2$  is O,  $CR_{E-2-2}$ , or  $C(R_{E-2-2})_2$ , provided that when  $E^2$  is  $CR_{E-2-2}$ , one  $R_{E-2}$  is a bond to  $CR_{E-2-2}$ , and further provided that at least one of  $E^1$  or  $E^2$  is O;

Each  $R_{E-2-2}$  is independently H, F, Br, Cl, CN, alkyl, haloalkyl, substituted alkyl, alkynyl, cycloalkyl,  $-OR_E$ , or  $-N(R_E)_2$ , provided that at least one  $R_{E-2-2}$  is H when  $E^2$  is  $C(R_{E-2-2})_2$ ;

Each  $R_{E-2}$  is independently H, alkyl, substituted alkyl, haloalkyl, cycloalkyl, heterocycloalkyl, or a bond to  $E^2$  provided that  $E^2$  is  $CR_{E-2-2}$ ;

Each  $R_E$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

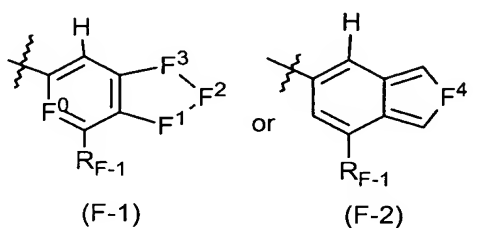
Each  $R_{E-3}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or phenyl having 1 substituent selected from  $R_9$  and further having 0-3 substituents independently selected from F, Cl, Br, or I or substituted phenyl;

$R_{E-4}$  is H, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or substituted phenyl;

Each  $R_{E-5}$  is independently H, haloalkyl, substituted alkyl, cycloalkyl,  
 5 halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ , or  $R_6$ ;

Each  $R_{E-6}$  is independently alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or phenyl having 1 substituent selected  
 10 from  $R_9$  and further having 0-3 substituents independently selected from F, Cl, Br, or I;

wherein W is (F):



15  $F^0$  is C(H) wherein  $F^1 \text{---} F^2 \text{---} F^3$  is selected from O-C( $R_{F-2}$ )=N, O-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), O-C( $R_{F-3}$ )( $R_{F-2}$ )-S, O-N=C( $R_{F-3}$ ), O-C( $R_{F-2}$ )( $R_{F-3}$ )-O, S-C( $R_{F-2}$ )=N, S-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), S-N=C( $R_{F-3}$ ), N=C( $R_{F-2}$ )-O, N=C( $R_{F-2}$ )-S, N=C( $R_{F-2}$ )-N( $R_{F-4}$ ), N( $R_{F-4}$ )-N=C( $R_{F-3}$ ), N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-O, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-S, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-O-N( $R_{F-4}$ ),  
 20 C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-O, C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-S, C( $R_{F-3}$ )=N-O, C( $R_{F-3}$ )=N-S, C( $R_{F-3}$ )=N-N( $R_{F-4}$ ), or C( $R_{F-3}$ )<sub>2</sub>-C( $R_{F-2}$ )( $R_{F-3}$ )-C( $R_{F-3}$ )<sub>2</sub>;

$F^0$  is N wherein  $F^1 \text{---} F^2 \text{---} F^3$  is selected from O-C( $R_{F-2}$ )=N, O-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), O-C( $R_{F-3}$ )( $R_{F-2}$ )-S, O-N=C( $R_{F-3}$ ), O-C( $R_{F-2}$ )( $R_{F-3}$ )-O, S-C( $R_{F-2}$ )=N, S-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), S-N=C( $R_{F-3}$ ), N=C( $R_{F-2}$ )-O, N=C( $R_{F-2}$ )-S,  
 25 N=C( $R_{F-2}$ )-N( $R_{F-4}$ ), N( $R_{F-4}$ )-N=C( $R_{F-3}$ ), N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-O, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-S, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-O-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-O, C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-S, C( $R_{F-3}$ )=N-O, C( $R_{F-3}$ )=N-S, C( $R_{F-3}$ )=N-N( $R_{F-4}$ ), C( $R_{F-3}$ )=C( $R_{F-2}$ )-C( $R_{F-3}$ )<sub>2</sub>, or C( $R_{F-3}$ )<sub>2</sub>-C( $R_{F-2}$ )( $R_{F-3}$ )-C( $R_{F-3}$ )<sub>2</sub>;

$F^4$  is N( $R_{F-7}$ ), O, or S;

30  $R_{F-1}$  is H, F, Cl, Br, I, -CN, -CF<sub>3</sub>, -OR<sub>F-8</sub>, -SR<sub>F-8</sub>, or -N( $R_{F-8}$ )<sub>2</sub>;

$R_{F-2}$  is H, F, alkyl, haloalkyl, substituted alkyl, lactam heterocycloalkyl, phenoxy, substituted phenoxy,  $R_5$ ,  $R_6$ ,  $-N(R_{F-4})$ -aryl,  $-N(R_{F-4})$ -substituted phenyl,  $-N(R_{F-4})$ -substituted naphthyl,  $-O$ -substituted phenyl,  $-O$ -substituted naphthyl,  $-S$ -substituted phenyl,  $-S$ -substituted naphthyl, or alkyl substituted on the  $\omega$  carbon with  $R_{F-9}$ ;

$R_{F-3}$  is H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl,  $-CN$ ,  $-NO_2$ ,  $-OR_{F-8}$ ,  $-C(O)N(R_{F-8})_2$ ,  $-NHR_{F-8}$ ,  $-NR_{F-8}COR_{F-8}$ ,  $-N(R_{F-8})_2$ ,  $-SR_{F-8}$ ,  $-C(O)R_{F-8}$ ,  $-CO_2R_{F-8}$ , aryl,  $R_5$ , or  $R_6$ ;

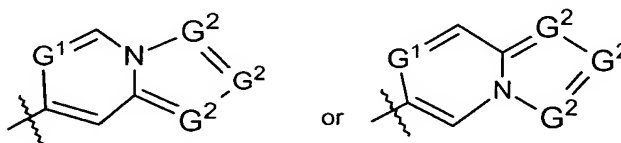
$R_{F-4}$  is H, or alkyl;

$R_{F-7}$  is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, phenyl, or phenyl having 1 substituent selected from  $R_9$  and further having 0-3 substituents independently selected from F, Cl, Br, or I;

$R_{F-8}$  is H, alkyl, substituted alkyl, cycloalkyl, haloalkyl, heterocycloalkyl, substituted heterocycloalkyl, substituted phenyl, or substituted naphthyl;

$R_{F-9}$  is aryl,  $R_5$ , or  $R_6$ ;

wherein W is (G):



$G^1$  is N or CH;

Each  $G^2$  is N or  $C(R_{G-1})$ , provided that no more than one  $G^2$  N;

Each  $R_{G-1}$  is independently H, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl,  $-CN$ ,  $-NO_2$ , F, Br, Cl, I,  $-C(O)N(R_{G-3})_2$ ,  $-N(R_{G-3})_2$ ,  $-SR_{G-6}$ ,  $-S(O)_2R_{G-6}$ ,  $-OR_{G-6}$ ,  $-C(O)R_{G-6}$ ,  $-CO_2R_{G-6}$ , aryl,  $R_5$ ,  $R_6$ , or two  $R_{G-1}$  on adjacent carbon atoms may combine for W to be a 6-5-6 fused-tricyclic-heteroaromatic-ring system optionally substituted on the newly formed ring where valency allows with 1-2 substituents independently selected from F, Cl, Br, I, and  $R_{G-2}$ ;

$R_{G-2}$  is alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl,  $-OR_{G-8}$ ,  $-SR_{G-8}$ ,

-S(O)<sub>2</sub>R<sub>G-8</sub>, -S(O)R<sub>G-8</sub>, -OS(O)<sub>2</sub>R<sub>G-8</sub>, -N(R<sub>G-8</sub>)<sub>2</sub>, -C(O)R<sub>G-8</sub>, -C(S)R<sub>G-8</sub>, -C(O)OR<sub>G-8</sub>,  
 -CN, -C(O)N(R<sub>G-8</sub>)<sub>2</sub>, -NR<sub>G-8</sub>C(O)R<sub>G-8</sub>, -S(O)<sub>2</sub>N(R<sub>G-8</sub>)<sub>2</sub>, -NR<sub>G-8</sub>S(O)<sub>2</sub>R<sub>G-8</sub>, -NO<sub>2</sub>,  
 -N(R<sub>G-8</sub>)C(O)N(R<sub>G-8</sub>)<sub>2</sub>, substituted alkyl, substituted alkenyl, substituted alkynyl,  
 substituted cycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl,  
 5 phenyl having 0-4 substituents independently selected from F, Cl, Br, I and R<sub>G-7</sub>,  
 naphthyl, or naphthyl having 0-4 substituents independently selected from F, Cl, Br, I,  
 or R<sub>G-7</sub>;

provided that when G<sup>2</sup> adjacent to the bridge N is C(R<sub>G-1</sub>) and the other G<sup>2</sup> are  
 CH, that R<sub>G-1</sub> is other than H, F, Cl, I, alkyl, substituted alkyl or alkynyl;

10 Each R<sub>G-3</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl  
 substituted with 1 substituent selected from R<sub>G-4</sub>, cycloalkyl substituted with 1  
 substituent selected from R<sub>G-4</sub>, heterocycloalkyl substituted with 1 substituent selected  
 from R<sub>G-4</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted  
 phenyl;

15 R<sub>G-4</sub> is -OR<sub>G-5</sub>, -SR<sub>G-5</sub>, -N(R<sub>G-5</sub>)<sub>2</sub>, -C(O)R<sub>G-5</sub>, -SOR<sub>G-5</sub>, -SO<sub>2</sub>R<sub>G-5</sub>,  
 -C(O)N(R<sub>G-5</sub>)<sub>2</sub>, -CN, -CF<sub>3</sub>, -NR<sub>G-5</sub>C(O)R<sub>G-5</sub>, -S(O)<sub>2</sub>N(R<sub>G-5</sub>)<sub>2</sub>, -NR<sub>G-5</sub>S(O)<sub>2</sub>R<sub>G-5</sub>, or  
 -NO<sub>2</sub>;

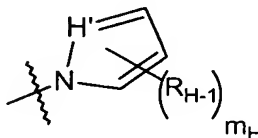
Each R<sub>G-5</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl,  
 halocycloalkyl, or haloheterocycloalkyl;

20 R<sub>G-6</sub> is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl,  
 substituted cycloalkyl, phenyl, or phenyl having 0-4 substituents independently  
 selected from F, Cl, Br, I, and R<sub>G-7</sub>;

R<sub>G-7</sub> is alkyl, substituted alkyl, haloalkyl, -OR<sub>G-5</sub>, -CN, -NO<sub>2</sub>, -N(R<sub>G-3</sub>)<sub>2</sub>;

Each R<sub>G-8</sub> is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl,  
 25 halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl,  
 substituted heterocycloalkyl, phenyl, or phenyl substituted with 0-4 independently  
 selected from F, Cl, Br, I, or R<sub>G-7</sub>;

wherein W is (H)



30

H' is N or CH;

Each  $R_{H-1}$  is independently F, Cl, Br, I, -CN, -NO<sub>2</sub>, alkyl, haloalkyl, substituted alkyl, alkenyl, haloalkenyl, substituted alkenyl, alkynyl, haloalkynyl, substituted alkynyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, aryl, R<sub>5</sub>, R<sub>6</sub>, -OR<sub>8</sub>, -SR<sub>8</sub>, -SOR<sub>8</sub>, -SO<sub>2</sub>R<sub>8</sub>, -SCN, -S(O)N(R<sub>8</sub>)<sub>2</sub>, -S(O)<sub>2</sub>N(R<sub>8</sub>)<sub>2</sub>, -C(O)R<sub>8</sub>, -C(O)<sub>2</sub>R<sub>8</sub>, -C(O)N(R<sub>8</sub>)<sub>2</sub>, C(R<sub>8</sub>)=N-OR<sub>8</sub>, -NC(O)R<sub>5</sub>, -NC(O)R<sub>H-3</sub>, -NC(O)R<sub>6</sub>, -N(R<sub>8</sub>)<sub>2</sub>, -NR<sub>8</sub>C(O)R<sub>8</sub>, -NR<sub>8</sub>S(O)<sub>2</sub>R<sub>8</sub>, or two  $R_{H-1}$  on adjacent carbon atoms may fuse to form a 6-membered ring to give a 5-6 fused, bicyclic moiety where the 6-membered ring is optionally substituted with 1-3 substituents selected from  $R_{H-2}$ ;

$m_H$  is 0, 1, or 2;

$R_{H-2}$  is alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, -OR<sub>H-3</sub>, -SR<sub>H-3</sub>, -S(O)<sub>2</sub>R<sub>H-3</sub>, -S(O)R<sub>H-3</sub>, -OS(O)<sub>2</sub>R<sub>H-3</sub>, -N(R<sub>H-3</sub>)<sub>2</sub>, -C(O)R<sub>H-3</sub>, -C(S)R<sub>H-3</sub>, -C(O)OR<sub>H-3</sub>, -CN, -C(O)N(R<sub>H-3</sub>)<sub>2</sub>, -NR<sub>H-3</sub>C(O)R<sub>H-3</sub>, -S(O)<sub>2</sub>N(R<sub>H-3</sub>)<sub>2</sub>, -NR<sub>H-3</sub>S(O)<sub>2</sub>R<sub>H-3</sub>, -NO<sub>2</sub>, -N(R<sub>H-3</sub>)C(O)N(R<sub>H-3</sub>)<sub>2</sub>, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl, phenyl having 0-4 substituents independently selected from F, Cl, Br, I and R<sub>7</sub>, naphthyl, naphthyl having 0-4 substituents independently selected from F, Cl, Br, I, or R<sub>7</sub>, or two  $R_{H-2}$  on adjacent carbon atoms may combine to form a three-ring-fused-5-6-6 system optionally substituted with up to 3 substituents independently selected from Br, Cl, F, I, -CN, -NO<sub>2</sub>, -CF<sub>3</sub>, -N(R<sub>H-3</sub>)<sub>2</sub>, -N(R<sub>H-3</sub>)C(O)R<sub>H-3</sub>, alkyl, alkenyl, and alkynyl;

Each  $R_{H-3}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, phenyl, or phenyl substituted with 0-4 independently selected from F, Cl, Br, I, or R<sub>7</sub>;

or pharmaceutical composition, pharmaceutically acceptable salt, racemic mixture, or pure enantiomer thereof.

6. The method of claim 5, wherein the Acetylcholinesterase inhibitor is physostigmine, aricept, rivastigmine, galantamine, monoamine acridines and derivatives, piperidinyl-alkanoyl heterocyclic compounds, N-benzyl-piperidine

derivatives, 4-(1-benzylpiperidyl)-substituted fused quinoline derivatives, and cyclic amide derivatives.

7. The method of claim 5, wherein X is O, R<sub>1</sub> is H, R<sub>2</sub> is absent, R<sub>2,3</sub> is H, each  
 5 R<sub>3</sub> is H, R<sub>4</sub> is H and W is 4-chlorobenz-1-yl; dibenzo[b,d]thiophene-2-yl;  
 isoquinoline-3-yl; furo[2,3-c]pyridine-5-yl; 1,3-benzodioxole-5-yl; 2,3-dihydro-1,4-  
 benzodioxine-6-yl; 1,3-benzoxazole-5-yl; thieno[2,3-c]pyridine-5-yl; thieno[3,2-  
 c]pyridine-6-yl; [1]benzothieno[3,2-c]pyridine-3-yl; 1,3-benzothiazole-6-yl;  
 thieno[3,4-c]pyridine-6-yl; 2,3-dihydro-1-benzofuran-5-yl; 1-benzofuran-5-yl;  
 10 furo[3,2-c]pyridine-6-yl; [1]benzothieno[2,3-c]pyridine-3-yl; dibenzo[b,d]furan-2-yl;  
 1-benzofuran-6-yl; 2-naphthyl; 1H-indole-6-yl; pyrrolo[1,2-c]pyrimidine-3-yl; 1-  
 benzothiophene-5-yl; 1-benzothiophene-5-yl; 1-benzothiophene-6-yl; pyrrolo[1,2-  
 a]pyrazine-3-yl; 1H-indole-6-yl; pyrazino[1,2-a]indole-3-yl; 1,3-benzothiazole-6-yl;  
 [1]benzofuro[2,3-c]pyridine-3-yl; [1]benzofuro[2,3-c]pyridine-3-yl; 2H-chromene-6-  
 15 yl; indolizine-6-yl; and [1,3]dioxolo[4,5-c]pyridine-6-yl; any of which is optionally  
 substituted as allowed in claim 5.

8. The method of claim 7, wherein the agonist is  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-4-chlorobenzamide;  
 20 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]dibenzo[b,d]thiophene-2-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]isoquinoline-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methylfuro[2,3-c]pyridine-5-carboxamide;  
 25 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2,3-dihydro-1,4-benzodioxine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]isoquinoline-3-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-methylfuro[2,3-c]pyridine-5-  
 carboxamide;  
 30 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzoxazole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1,3-benzoxazole-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[3,2-c]pyridine-6-carboxamide;

- N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-isopropylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 5-{[(2R)-7-azoniabicyclo[2.2.1]hept-2-ylamino]carbonyl}-3-ethylfuro[2,3-c]pyridin-6-ium dichloride;  
 5-{[(2R)-7-azoniabicyclo[2.2.1]hept-2-ylamino]carbonyl}-3-isopropylfuro[2,3-c]pyridin-6-ium dichloride;  
 10 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-1-azabicyclo[2.2.2]oct-3-yl[1]benzothieno[3,2-c]pyridine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-chlorofuro[2,3-c]pyridine-5-carboxamide;  
 N-1-azabicyclo[2.2.2]oct-3-ylfuro[2,3-c]pyridine-5-carboxamide;  
 15 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,4-c]pyridine-6-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2,3-dihydro-1-benzofuran-5-carboxamide;  
 20 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]furo[3,2-c]pyridine-6-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-ethylfuro[2,3-c]pyridine-5-carboxamide;  
 25 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-isopropylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-chlorofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-chlorofuro[2,3-c]pyridine-5-carboxamide;  
 30 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-4-chlorobenzamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[3,4-c]pyridine-6-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]dibenzo[b,d]thiophene-2-carboxamide;

- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1]benzothieno[2,3-c]pyridine-3-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1]benzothieno[2,3-c]pyridine-3-carboxamide;
- 5 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]dibenzo[b,d]furan-2-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1-benzofuran-5-carboxamide;
- 10 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-2-naphthamide;
- 15 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1H-indole-6-carboxamide;
- 20 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 3-methyl-N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;
- 25 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;
- 30 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;

- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-bromofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromo-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromo-1-benzofuran-5-carboxamide;  
 5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromothieno[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromothieno[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzothiophene-5-carboxamide;  
 N-[(3S)-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 10 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-methyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-methyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1-benzofuran-6-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1-benzofuran-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-6-carboxamide;  
 15 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzothiophene-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-methyl-1H-indole-6-carboxamide;  
 20 N-[(3S)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-isopropyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-isopropyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethynylfuro[2,3-c]pyridine-5-carboxamide;  
 25 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1H-indazole-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-2-methyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrazino[1,2-a]indole-3-carboxamide;  
 3-bromo-N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 30 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-7-methoxy-2-naphthamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;

- N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-bromo-1-benzofuran-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1]benzofuro[2,3-c]pyridine-3-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1]benzofuro[2,3-c]pyridine-3-  
 5 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethynyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-ethynyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2H-chromene-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-prop-1-ynyl-1-benzofuran-5-carboxamide;  
 10 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-phenyl-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-bromopyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-prop-1-ynylfuro[2,3-c]pyridine-5-  
 carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-  
 15 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]indolizine-6-carboxamide;  
 2-amino-N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-ethynylpyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-8-methoxy-2-naphthamide;  
 20 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]indolizine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1,3]dioxolo[4,5-c]pyridine-6-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1,3]dioxolo[4,5-c]pyridine-6-  
 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-cyano-1-benzofuran-5-carboxamide;  
 25 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl][1,3]dioxolo[4,5-c]pyridine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-  
 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-7-hydroxy-2-naphthamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-ethynylfuro[2,3-c]pyridine-5-  
 30 carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-6-chloroisoquinoline-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-  
 carboxamide;

N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-carboxamide;

N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-methylisoquinoline-3-carboxamide;

N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-6-methylisoquinoline-3-carboxamide;

5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-cyanofuro[2,3-c]pyridine-5-carboxamide;

N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-naphthamide; and

N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]dibenzo[b,d]furan-2-carboxamide, provided that the agonist is a free base or a pharmaceutically acceptable salt thereof.

10 9. The method of claim 8, wherein the disease or condition is cognitive and attention deficit symptoms of Alzheimer's, neurodegeneration associated with diseases such as Alzheimer's disease, pre-senile dementia (mild cognitive impairment), senile dementia, amyotrophic lateral sclerosis, traumatic brain injury, behavioral and cognitive problems in general and associated with brain tumors, AIDS  
15 dementia complex, dementia associated with Down's syndrome, dementia associated with Lewy Bodies, Huntington's disease, Parkinson's disease, age-related macular degeneration.

10. The method of claim 8, wherein the Acetylcholinesterase inhibitor is  
20 physostigmine, aricept, rivastigmine, galantamine, monoamine acridines and derivatives, piperidiny-alkanoyl heterocyclic compounds, N-benzyl-piperidine derivatives, 4-(1-benzylpiperidyl)-substituted fused quinoline derivatives, and cyclic amide derivatives.

25 11. The method of claim 10, wherein the disease or condition is cognitive and attention deficit symptoms of Alzheimer's, neurodegeneration associated with diseases such as Alzheimer's disease, pre-senile dementia (mild cognitive impairment), senile dementia, amyotrophic lateral sclerosis, traumatic brain injury, behavioral and cognitive problems in general and associated with brain tumors, AIDS  
30 dementia complex, dementia associated with Down's syndrome, dementia associated with Lewy Bodies, Huntington's disease, Parkinson's disease, age-related macular degeneration.

12. The method of claim 1, wherein the agonist is administered with an effective amount of the beta secretase inhibitor and optionally with an effective amount of the acetylcholineesterase inhibitor and the gamma secretase inhibitor.

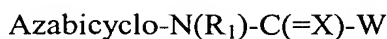
5 13. The method of claim 1, wherein the agonist is administered with an effective amount of the acetylcholineesterase inhibitor and optionally with an effective amount of the beta secretase inhibitor and the gamma secretase inhibitor.

10 14. The method of claim 13, wherein the acetylcholineesterase inhibitor is physostigmine, aricept, rivastigmine, galantamine, monoamine acridines and derivatives, piperidinyl-alkanoyl heterocyclic compounds, N-benzyl-piperidine derivatives, 4-(1-benzylpiperidyl)-substituted fused quinoline derivatives, and cyclic amide derivatives.

15 15. The method of claim 1, wherein the agonist is administered with an effective amount of the gamma secretase inhibitor and optionally with an effective amount of the beta secretase inhibitor and the acetylcholineesterase inhibitor.

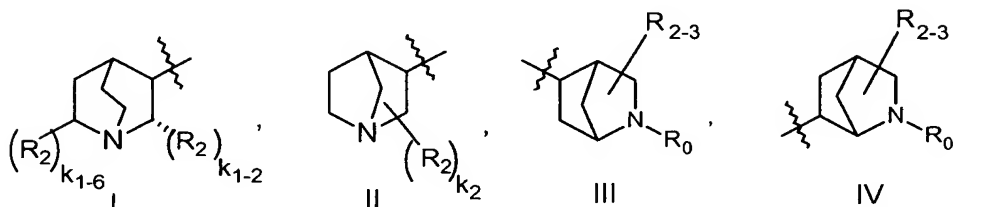
16. A composition comprising an effective amount of an alpha 7 nAChR full agonist and at least one of an effective amount of a beta secretase inhibitor, effective amount of an acetylcholineesterase inhibitor, and an effective amount of a gamma secretase inhibitor.

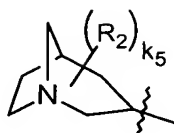
17. The composition of claim 16, wherein the alpha 7 nAChR full agonist is a compound of formula I:



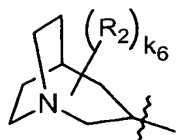
Formula I

wherein Azabicyclo is

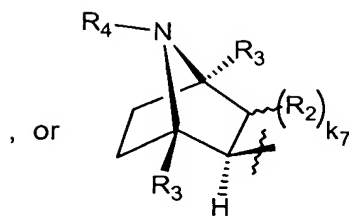




V



VI



VII

wherein X is O, or S;

R<sub>0</sub> is H, lower alkyl, substituted lower alkyl, or lower haloalkyl;

Each R<sub>1</sub> is H, alkyl, cycloalkyl, haloalkyl, substituted phenyl, or substituted  
5 naphthyl;

Each R<sub>2</sub> is independently F, Cl, Br, I, alkyl, substituted alkyl, haloalkyl,  
cycloalkyl, aryl, or R<sub>2</sub> is absent provided that k<sub>1-2</sub>, k<sub>1-6</sub>, k<sub>2</sub>, k<sub>5</sub>, k<sub>6</sub>, or k<sub>7</sub> is 0;

k<sub>1-2</sub> is 0 or 1;

k<sub>1-6</sub> is 0 or 1, provided that the sum of k<sub>1-2</sub> and k<sub>1-6</sub> is one;

10 k<sub>2</sub> is 0 or 1;

k<sub>5</sub> is 0, 1, or 2;

k<sub>6</sub> is 0, 1, or 2;

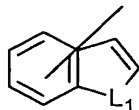
k<sub>7</sub> is 0 or 1;

R<sub>2-3</sub> is H, F, Cl, Br, I, alkyl, haloalkyl, substituted alkyl, cycloalkyl, or aryl;

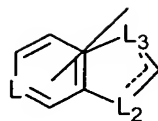
15 Each R<sub>3</sub> is independently H, alkyl, or substituted alkyl;

R<sub>4</sub> is H, alkyl, an amino protecting group, or an alkyl group having 1-3  
substituents selected from F, Cl, Br, I, -OH, -CN, -NH<sub>2</sub>, -NH(alkyl), or -N(alkyl)<sub>2</sub>;

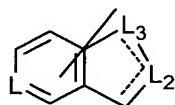
R<sub>5</sub> is 5-membered heteroaromatic mono-cyclic moieties containing within the  
ring 1-3 heteroatoms independently selected from the group consisting of -O-, =N-,  
20 -N(R<sub>10</sub>)-, and -S-, and having 0-1 substituent selected from R<sub>9</sub> and further having 0-3  
substituents independently selected from F, Cl, Br, or I, or R<sub>5</sub> is 9-membered fused-  
ring moieties having a 6-membered ring fused to a 5-membered ring and having the  
formula



25 wherein L<sub>1</sub> is O, S, or NR<sub>10</sub>,



wherein L is CR<sub>12</sub> or N, L<sub>2</sub> and L<sub>3</sub> are independently selected from CR<sub>12</sub>, C(R<sub>12</sub>)<sub>2</sub>, O, S, N, or NR<sub>10</sub>, provided that both L<sub>2</sub> and L<sub>3</sub> are not simultaneously O, simultaneously S, or simultaneously O and S, or



5

wherein L is CR<sub>12</sub> or N, and L<sub>2</sub> and L<sub>3</sub> are independently selected from CR<sub>12</sub>, O, S, N, or NR<sub>10</sub>, and each 9-membered fused-ring moiety having 0-1 substituent selected from R<sub>9</sub> and further having 0-3 substituent(s) independently selected from F, Cl, Br, or I, wherein the R<sub>5</sub> moiety attaches to other substituents as defined in formula I at any

10 position as valency allows;

R<sub>6</sub> is 6-membered heteroaromatic mono-cyclic moieties containing within the ring 1-3 heteroatoms selected from =N- and having 0-1 substituent selected from R<sub>9</sub> and 0-3 substituent(s) independently selected from F, Cl, Br, or I, or R<sub>6</sub> is 10-membered heteroaromatic bi-cyclic moieties containing within one or both rings 1-3  
15 heteroatoms selected from =N-, including, but not limited to, quinolinyl or isoquinolinyl, each 10-membered fused-ring moiety having 0-1 substituent selected from R<sub>9</sub> and 0-3 substituent(s) independently selected from F, Cl, Br, or I, wherein the R<sub>6</sub> moiety attaches to other substituents as defined in formula I at any position as valency allows;

20 R<sub>7</sub> is alkyl, substituted alkyl, haloalkyl, -OR<sub>11</sub>, -CN, -NO<sub>2</sub>, -N(R<sub>8</sub>)<sub>2</sub>;

Each R<sub>8</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from R<sub>13</sub>, cycloalkyl substituted with 1 substituent selected from R<sub>13</sub>, heterocycloalkyl substituted with 1 substituent selected from R<sub>13</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted  
25 phenyl;

R<sub>9</sub> is alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, -OR<sub>14</sub>, -SR<sub>14</sub>, -N(R<sub>14</sub>)<sub>2</sub>, -C(O)R<sub>14</sub>, -C(O)N(R<sub>14</sub>)<sub>2</sub>, -CN, -NR<sub>14</sub>C(O)R<sub>14</sub>, -S(O)<sub>2</sub>N(R<sub>14</sub>)<sub>2</sub>, -NR<sub>14</sub>S(O)<sub>2</sub>R<sub>14</sub>, -NO<sub>2</sub>, alkyl substituted with 1-4 substituent(s) independently selected from F, Cl, Br, I, or R<sub>13</sub>, cycloalkyl substituted  
30 with 1-4 substituent(s) independently selected from F, Cl, Br, I, or R<sub>13</sub>, or

heterocycloalkyl substituted with 1-4 substituent(s) independently selected from F, Cl, Br, I, or R<sub>13</sub>;

R<sub>10</sub> is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, phenyl, or phenyl having 1 substituent selected from R<sub>7</sub> and  
5 further having 0-3 substituents independently selected from F, Cl, Br, or I;

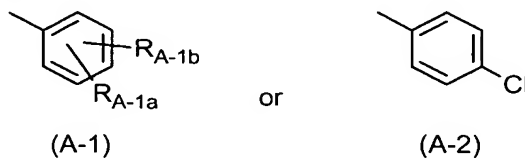
Each R<sub>11</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

Each R<sub>12</sub> is independently H, F, Cl, Br, I, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted  
10 cycloalkyl, substituted heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>14</sub>, -SR<sub>14</sub>, -N(R<sub>14</sub>)<sub>2</sub>, -C(O)R<sub>14</sub>, -C(O)N(R<sub>14</sub>)<sub>2</sub>, -NR<sub>14</sub>C(O)R<sub>14</sub>, -S(O)<sub>2</sub>N(R<sub>14</sub>)<sub>2</sub>, -NR<sub>14</sub>S(O)<sub>2</sub>RR<sub>14</sub>, or a bond directly or indirectly attached to the core molecule, provided that there is only one said bond to the core molecule within the 9-membered fused-ring moiety, further provided that where valency allows the fused-ring moiety has 0-1 substituent selected from  
15 alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted cycloalkyl, substituted heterocycloalkyl, -OR<sub>14</sub>, -SR<sub>14</sub>, -N(R<sub>14</sub>)<sub>2</sub>, -C(O)R<sub>14</sub>, -NO<sub>2</sub>, -C(O)N(R<sub>14</sub>)<sub>2</sub>, -CN, -NR<sub>14</sub>C(O)R<sub>14</sub>, -S(O)<sub>2</sub>N(R<sub>14</sub>)<sub>2</sub>, or -NR<sub>14</sub>S(O)<sub>2</sub>R<sub>14</sub>, and further provided that the fused-ring moiety has 0-3 substituent(s) selected from F, Cl, Br, or I;

20 R<sub>13</sub> is -OR<sub>14</sub>, -SR<sub>14</sub>, -N(R<sub>14</sub>)<sub>2</sub>, -C(O)R<sub>14</sub>, -C(O)N(R<sub>14</sub>)<sub>2</sub>, -CN, -CF<sub>3</sub>, -NR<sub>14</sub>C(O)R<sub>14</sub>, -S(O)<sub>2</sub>N(R<sub>14</sub>)<sub>2</sub>, -NR<sub>14</sub>S(O)<sub>2</sub>R<sub>14</sub>, or -NO<sub>2</sub>;

Each R<sub>14</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

25 wherein W is (A):



wherein R<sub>A-1a</sub> is H, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted  
30 heterocycloalkyl, aryl, -R<sub>5</sub>, R<sub>6</sub>, -OR<sub>A-3</sub>, -OR<sub>A-4</sub>, -SR<sub>A-3</sub>, F, Cl, Br, I, -N(R<sub>A-3</sub>)<sub>2</sub>, -N(R<sub>A-5</sub>)<sub>2</sub>, -C(O)R<sub>A-3</sub>, -C(O)R<sub>A-5</sub>, -CN, -C(O)N(R<sub>A-3</sub>)<sub>2</sub>, -C(O)N(R<sub>A-6</sub>)<sub>2</sub>,

$-\text{NR}_{\text{A-3}}\text{C}(\text{O})\text{R}_{\text{A-3}}$ ,  $-\text{S}(\text{O})\text{R}_{\text{A-3}}$ ,  $-\text{OS}(\text{O})_2\text{R}_{\text{A-3}}$ ,  $-\text{NR}_{\text{A-3}}\text{S}(\text{O})_2\text{R}_{\text{A-3}}$ ,  $-\text{NO}_2$ , and  $-\text{N}(\text{H})\text{C}(\text{O})\text{N}(\text{H})\text{R}_{\text{A-3}}$ ;

$\text{R}_{\text{A-1b}}$  is  $-\text{O}-\text{R}_{\text{A-3}}$ ,  $-\text{S}-\text{R}_{\text{A-3}}$ ,  $-\text{S}(\text{O})-\text{R}_{\text{A-3}}$ ,  $-\text{C}(\text{O})-\text{R}_{\text{A-7}}$ , and alkyl substituted on the  $\omega$  carbon with  $\text{R}_{\text{A-7}}$ ;

5 Each  $\text{R}_{\text{A-3}}$  is independently selected from H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $\text{R}_5$ ,  $\text{R}_6$ , phenyl, or substituted phenyl;

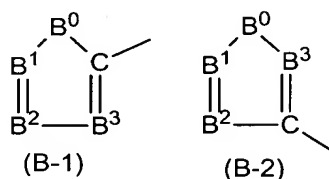
$\text{R}_{\text{A-4}}$  is selected from cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, or substituted heterocycloalkyl;

10 Each  $\text{R}_{\text{A-5}}$  is independently selected from cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $\text{R}_5$ ,  $\text{R}_6$ , phenyl, or substituted phenyl;

Each  $\text{R}_{\text{A-6}}$  is independently selected from alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $\text{R}_5$ ,  $\text{R}_6$ , phenyl, or substituted phenyl;

$\text{R}_{\text{A-7}}$  is selected from aryl,  $\text{R}_5$ , or  $\text{R}_6$ ;

wherein W is (B):



20 wherein  $\text{B}^0$  is  $-\text{O}-$ ,  $-\text{S}-$ , or  $-\text{N}(\text{R}_{\text{B-0}})-$ ;

$\text{B}^1$  and  $\text{B}^2$  are independently selected from  $=\text{N}-$ , or  $=\text{C}(\text{R}_{\text{B-1}})-$ ;

$\text{B}^3$  is  $=\text{N}-$ , or  $=\text{CH}-$ , provided that when both  $\text{B}^1$  and  $\text{B}^2$  are  $=\text{C}(\text{R}_{\text{B-1}})-$  and  $\text{B}^3$  is  $=\text{CH}-$ , only one  $=\text{C}(\text{R}_{\text{B-1}})-$  can be  $=\text{CH}-$ , and further provided that when  $\text{B}^0$  is  $-\text{O}-$ ,  $\text{B}^2$  is  $=\text{C}(\text{R}_{\text{B-1}})-$  and  $\text{B}^3$  is  $=\text{C}(\text{H})-$ ,  $\text{B}^1$  cannot be  $=\text{N}-$ ,

25  $\text{R}_{\text{B-0}}$  is H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, limited substituted alkyl, substituted cycloalkyl, substituted heterocycloalkyl, or aryl, and provided that when B is (B-2) and  $\text{B}^3$  is  $=\text{N}-$  and  $\text{B}^0$  is  $\text{N}(\text{R}_{\text{B-0}})$ ,  $\text{R}_{\text{B-0}}$  cannot be phenyl or substituted phenyl;

$\text{R}_{\text{B-1}}$  is H, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl,

substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, limited substituted alkyl, limited substituted alkenyl, limited substituted alkynyl, aryl, -OR<sub>B-2</sub>, -OR<sub>B-3</sub>, -SR<sub>B-2</sub>, -SR<sub>B-3</sub>, F, Cl, Br, I, -N(R<sub>B-2</sub>)<sub>2</sub>, -N(R<sub>B-3</sub>)<sub>2</sub>, -C(O)R<sub>B-2</sub>, -C(O)R<sub>B-3</sub>, -C(O)N(R<sub>B-2</sub>)<sub>2</sub>, -C(O)N(R<sub>B-3</sub>)<sub>2</sub>, -CN,  
 5 -NR<sub>B-2</sub>C(O)R<sub>B-4</sub>, -S(O)<sub>2</sub>N(R<sub>B-2</sub>)<sub>2</sub>, -OS(O)<sub>2</sub>R<sub>B-4</sub>, -S(O)<sub>2</sub>R<sub>B-2</sub>, -S(O)<sub>2</sub>R<sub>B-3</sub>, -NR<sub>B-2</sub>S(O)<sub>2</sub>R<sub>B-2</sub>, -N(H)C(O)N(H)R<sub>B-2</sub>, -NO<sub>2</sub>, R<sub>5</sub>, and R<sub>6</sub>;

Each R<sub>B-2</sub> is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, R<sub>5</sub>, R<sub>6</sub>, phenyl, or substituted phenyl;

10 Each R<sub>B-3</sub> is independently H, alkyl, haloalkyl, limited substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl;

R<sub>B-4</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

15

wherein W is (C):

(C) is a six-membered heterocyclic ring system having 1-2 nitrogen atoms or a 10-membered bicyclic-six-six-fused-ring system having up to two nitrogen atoms within either or both rings, provided that no nitrogen is at a bridge of the bicyclic-six-six-fused-ring system, and further having 1-2 substituents independently selected  
 20 from R<sub>C-1</sub>;

Each R<sub>C-1</sub> is independently H, F, Cl, Br, I, alkyl, haloalkyl, substituted alkyl, alkenyl, haloalkenyl, substituted alkenyl, alkynyl, haloalkynyl, substituted alkynyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl,  
 25 haloheterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl, substituted phenyl, -NO<sub>2</sub>, -CN, -OR<sub>C-2</sub>, -SR<sub>C-2</sub>, -SOR<sub>C-2</sub>, -SO<sub>2</sub>R<sub>C-2</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-3</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-2</sub>, -NR<sub>C-2</sub>C(O)R<sub>C-4</sub>, -N(R<sub>C-2</sub>)<sub>2</sub>, -C(O)R<sub>C-2</sub>, -C(O)<sub>2</sub>R<sub>C-2</sub>, -C(O)N(R<sub>C-2</sub>)<sub>2</sub>, -SCN, -NR<sub>C-2</sub>C(O)R<sub>C-2</sub>, -S(O)N(R<sub>C-2</sub>)<sub>2</sub>, -S(O)<sub>2</sub>N(R<sub>C-2</sub>)<sub>2</sub>, -NR<sub>C-2</sub>S(O)<sub>2</sub>R<sub>C-2</sub>, R<sub>5</sub>, or R<sub>6</sub>;

Each R<sub>C-2</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl  
 30 substituted with 1 substituent selected from R<sub>C-5</sub>, cycloalkyl substituted with 1 substituent selected from R<sub>C-5</sub>, heterocycloalkyl substituted with 1 substituent selected from R<sub>C-5</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;

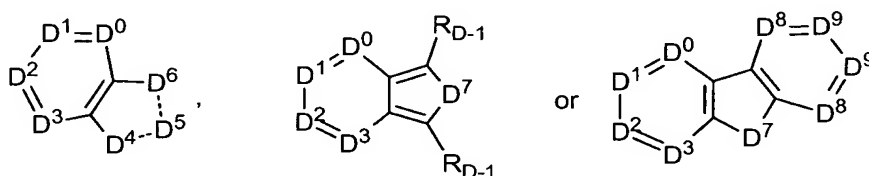
Each  $R_{C-3}$  is independently H, alkyl, or substituted alkyl;

$R_{C-4}$  is H, alkyl, an amino protecting group, or an alkyl group having 1-3 substituents selected from F, Cl, Br, I, -OH, -CN, -NH<sub>2</sub>, -NH(alkyl), or -N(alkyl)<sub>2</sub>;

$R_{C-5}$  is -CN, -CF<sub>3</sub>, -NO<sub>2</sub>, -OR<sub>C-6</sub>, -SR<sub>C-6</sub>, -N(R<sub>C-6</sub>)<sub>2</sub>, -C(O)R<sub>C-6</sub>, -SOR<sub>C-6</sub>,  
5 -SO<sub>2</sub>RR<sub>C-6</sub>, -C(O)N(R<sub>C-6</sub>)<sub>2</sub>, -NR<sub>C-6</sub>C(O)R<sub>C-6</sub>, -S(O)<sub>2</sub>N(R<sub>C-6</sub>)<sub>2</sub>, or -NR<sub>C-6</sub>S(O)<sub>2</sub>R<sub>C-6</sub>;

Each  $R_{C-6}$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

wherein W is (D):



10

provided that the bond between the -C(=X)- group and the W group may be attached at any available carbon atom within the D group as provided in  $R_{D-1}$ ,  $R_{D-3}$ , and  $R_{D-4}$ ;

$D^0$ ,  $D^1$ ,  $D^2$ , and  $D^3$  are N or C( $R_{D-1}$ ) provided that up to one of  $D^0$ ,  $D^1$ ,  $D^2$ , or  $D^3$  is N and the others are C( $R_{D-1}$ ), further provided that when the core molecule is  
15 attached at  $D^2$  and  $D^0$  or  $D^1$  is N,  $D^3$  is C(H), and further provided that there is only one attachment to the core molecule;

$D^4$ --- $D^5$ --- $D^6$  is selected from N( $R_{D-2}$ )-C( $R_{D-3}$ )=C( $R_{D-3}$ ), N=C( $R_{D-3}$ )-C( $R_{D-4}$ )<sub>2</sub>,  
C( $R_{D-3}$ )=C( $R_{D-3}$ )-N( $R_{D-2}$ ), C( $R_{D-3}$ )<sub>2</sub>-N( $R_{D-2}$ )-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-4}$ )<sub>2</sub>-C( $R_{D-3}$ )=N,  
N( $R_{D-2}$ )-C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>-N( $R_{D-2}$ ), O-C( $R_{D-3}$ )=C( $R_{D-3}$ ),  
20 O-C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-3}$ )<sub>2</sub>-O-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-3}$ )=C( $R_{D-3}$ )-O, C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>-O,  
S-C( $R_{D-3}$ )=C( $R_{D-3}$ ), S-C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-3}$ )<sub>2</sub>-S-C( $R_{D-3}$ )<sub>2</sub>, C( $R_{D-3}$ )=C( $R_{D-3}$ )-S,  
or C( $R_{D-3}$ )<sub>2</sub>-C( $R_{D-3}$ )<sub>2</sub>-S;

provided that when C(X) is attached to W at  $D^2$  and  $D^6$  is O, N( $R_{D-2}$ ), or S,  
 $D^4$ --- $D^5$  is not CH=CH;

25 and further provided that when C(X) is attached to W at  $D^2$  and  $D^4$  is O, N( $R_{D-2}$ ), or S,  $D^5$ --- $D^6$  is not CH=CH;

Each  $R_{D-1}$  is independently H, F, Br, I, Cl, -CN, -CF<sub>3</sub>, -OR<sub>D-5</sub>, -SR<sub>D-5</sub>,  
-N( $R_{D-5}$ )<sub>2</sub>, or a bond to -C(X)- provided that only one of  $R_{D-1}$ ,  $R_{D-3}$ , and  $R_{D-4}$  is said  
bond;

Each  $R_{D-2}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ , or  $R_6$ ;

Each  $R_{D-3}$  is independently H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>D-10</sub>, -C(O)N(R<sub>D-11</sub>)<sub>2</sub>, -NR<sub>D-10</sub>COR<sub>D-12</sub>, -N(R<sub>D-10</sub>)<sub>2</sub>, -SR<sub>D-10</sub>, -S(O)<sub>2</sub>R<sub>D-10</sub>, -C(O)R<sub>D-12</sub>, -CO<sub>2</sub>R<sub>D-10</sub>, aryl,  $R_5$ ,  $R_6$ , a bond to -C(X)- provided that only one of  $R_{D-1}$ ,  $R_{D-3}$ , and  $R_{D-4}$  is said bond;

Each  $R_{D-4}$  is independently H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>D-10</sub>, -C(O)N(R<sub>D-11</sub>)<sub>2</sub>, -NR<sub>D-10</sub>COR<sub>D-12</sub>, -N(R<sub>D-11</sub>)<sub>2</sub>, -SR<sub>D-10</sub>, -CO<sub>2</sub>R<sub>D-10</sub>, aryl,  $R_5$ ,  $R_6$ , a bond to -C(X)- provided that only one of  $R_{D-1}$ ,  $R_{D-3}$ , and  $R_{D-4}$  is said bond;

Each  $R_{D-5}$  is independently H, C<sub>1-3</sub> alkyl, or C<sub>2-4</sub> alkenyl;

$D^7$  is O, S, or N(R<sub>D-2</sub>);

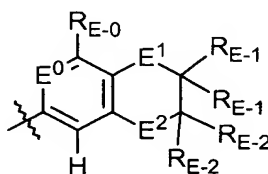
$D^8$  and  $D^9$  are C(R<sub>D-1</sub>), provided that when the molecule is attached to the phenyl moiety at  $D^9$ ,  $D^8$  is CH;

Each  $R_{D-10}$  is H, alkyl, cycloalkyl, haloalkyl, substituted phenyl, or substituted naphthyl;

Each  $R_{D-11}$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from  $R_{13}$ , cycloalkyl substituted with 1 substituent selected from  $R_{13}$ , heterocycloalkyl substituted with 1 substituent selected from  $R_{13}$ , haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;

$R_{D-12}$  is H, alkyl, substituted alkyl, cycloalkyl, haloalkyl, heterocycloalkyl, substituted heterocycloalkyl, substituted phenyl, or substituted naphthyl;

wherein W is (E):



$E^0$  is CH or N;

$R_{E-0}$  is H, F, Cl, Br, I, alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, aryl,  $R_5$ ,  $R_6$ ,  $-OR_{E-3}$ ,  $-OR_{E-4}$ ,  $-SR_{E-3}$ ,  $-SR_{E-5}$ ,  $-N(R_{E-3})_2$ ,  $-NR_{E-3}R_{E-6}$ ,  $-N(R_{E-6})_2$ ,  $-C(O)R_{E-3}$ ,  $-CN$ ,  $-C(O)N(R_{E-3})_2$ ,  $-NR_{E-3}C(O)R_{E-3}$ ,  $-S(O)R_{E-3}$ ,  $-S(O)R_{E-5}$ ,  $-OS(O)_2R_{E-3}$ ,  $-NR_{E-3}S(O)_2R_{E-3}$ ,  $-NO_2$ , or  $-N(H)C(O)N(H)R_{E-3}$ ;

$E^1$  is O,  $CR_{E-1-1}$ , or  $C(R_{E-1-1})_2$ , provided that when  $E^1$  is  $CR_{E-1-1}$ , one  $R_{E-1}$  is a bond to  $CR_{E-1-1}$ , and further provided that at least one of  $E^1$  or  $E^2$  is O;

Each  $R_{E-1-1}$  is independently H, F, Br, Cl, CN, alkyl, haloalkyl, substituted alkyl, alkynyl, cycloalkyl,  $-OR_E$ , or  $-N(R_E)_2$ , provided that at least one  $R_{E-1-1}$  is H when  $E^1$  is  $C(R_{E-1-1})_2$ ;

Each  $R_{E-1}$  is independently H, alkyl, substituted alkyl, haloalkyl, cycloalkyl, heterocycloalkyl, or a bond to  $E^1$  provided that  $E^1$  is  $CR_{E-1-1}$ ;

$E^2$  is O,  $CR_{E-2-2}$ , or  $C(R_{E-2-2})_2$ , provided that when  $E^2$  is  $CR_{E-2-2}$ , one  $R_{E-2}$  is a bond to  $CR_{E-2-2}$ , and further provided that at least one of  $E^1$  or  $E^2$  is O;

Each  $R_{E-2-2}$  is independently H, F, Br, Cl, CN, alkyl, haloalkyl, substituted alkyl, alkynyl, cycloalkyl,  $-OR_E$ , or  $-N(R_E)_2$ , provided that at least one  $R_{E-2-2}$  is H when  $E^2$  is  $C(R_{E-2-2})_2$ ;

Each  $R_{E-2}$  is independently H, alkyl, substituted alkyl, haloalkyl, cycloalkyl, heterocycloalkyl, or a bond to  $E^2$  provided that  $E^2$  is  $CR_{E-2-2}$ ;

Each  $R_E$  is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

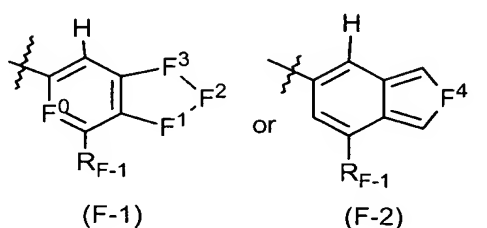
Each  $R_{E-3}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or phenyl having 1 substituent selected from  $R_9$  and further having 0-3 substituents independently selected from F, Cl, Br, or I or substituted phenyl;

$R_{E-4}$  is H, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or substituted phenyl;

Each  $R_{E-5}$  is independently H, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ , or  $R_6$ ;

Each  $R_{E-6}$  is independently alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl,  $R_5$ ,  $R_6$ , phenyl, or phenyl having 1 substituent selected from  $R_9$  and further having 0-3 substituents independently selected from F, Cl, Br, or I;

wherein W is (F):



$F^0$  is C(H) wherein  $F^1---F^2---F^3$  is selected from O-C( $R_{F-2}$ )=N, O-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), O-C( $R_{F-3}$ )( $R_{F-2}$ )-S, O-N=C( $R_{F-3}$ ), O-C( $R_{F-2}$ )( $R_{F-3}$ )-O, S-C( $R_{F-2}$ )=N, S-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), S-N=C( $R_{F-3}$ ), N=C( $R_{F-2}$ )-O, N=C( $R_{F-2}$ )-S, N=C( $R_{F-2}$ )-N( $R_{F-4}$ ), N( $R_{F-4}$ )-N=C( $R_{F-3}$ ), N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-O, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-S, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-O-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-O, C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-S, C( $R_{F-3}$ )=N-O, C( $R_{F-3}$ )=N-S, C( $R_{F-3}$ )=N-N( $R_{F-4}$ ), or C( $R_{F-3}$ )<sub>2</sub>-C( $R_{F-2}$ )( $R_{F-3}$ )-C( $R_{F-3}$ )<sub>2</sub>;

$F^0$  is N wherein  $F^1---F^2---F^3$  is selected from O-C( $R_{F-2}$ )=N, O-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), O-C( $R_{F-3}$ )( $R_{F-2}$ )-S, O-N=C( $R_{F-3}$ ), O-C( $R_{F-2}$ )( $R_{F-3}$ )-O, S-C( $R_{F-2}$ )=N, S-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), S-N=C( $R_{F-3}$ ), N=C( $R_{F-2}$ )-O, N=C( $R_{F-2}$ )-S, N=C( $R_{F-2}$ )-N( $R_{F-4}$ ), N( $R_{F-4}$ )-N=C( $R_{F-3}$ ), N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-O, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-S, N( $R_{F-4}$ )-C( $R_{F-3}$ )( $R_{F-2}$ )-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-O-N( $R_{F-4}$ ), C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-O, C( $R_{F-3}$ )<sub>2</sub>-N( $R_{F-4}$ )-S, C( $R_{F-3}$ )=N-O, C( $R_{F-3}$ )=N-S, C( $R_{F-3}$ )=N-N( $R_{F-4}$ ), C( $R_{F-3}$ )=C( $R_{F-2}$ )-C( $R_{F-3}$ )<sub>2</sub>, or C( $R_{F-3}$ )<sub>2</sub>-C( $R_{F-2}$ )( $R_{F-3}$ )-C( $R_{F-3}$ )<sub>2</sub>;

$F^4$  is N( $R_{F-7}$ ), O, or S;

$R_{F-1}$  is H, F, Cl, Br, I, -CN, -CF<sub>3</sub>, -OR<sub>F-8</sub>, -SR<sub>F-8</sub>, or -N( $R_{F-8}$ )<sub>2</sub>;

$R_{F-2}$  is H, F, alkyl, haloalkyl, substituted alkyl, lactam heterocycloalkyl, phenoxy, substituted phenoxy,  $R_5$ ,  $R_6$ , -N( $R_{F-4}$ )-aryl,

-N( $R_{F-4}$ )-substituted phenyl, -N( $R_{F-4}$ )-substituted naphthyl, -O-substituted phenyl,

-O-substituted naphthyl, -S-substituted phenyl, -S-substituted naphthyl, or alkyl substituted on the  $\omega$  carbon with  $R_{F-9}$ ;

$R_{F-3}$  is H, F, Br, Cl, I, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, heterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, -CN, -NO<sub>2</sub>, -OR<sub>F-8</sub>,  
 5 -C(O)N(R<sub>F-8</sub>)<sub>2</sub>, -NHR<sub>F-8</sub>, -NR<sub>F-8</sub>COR<sub>F-8</sub>, -N(R<sub>F-8</sub>)<sub>2</sub>, -SR<sub>F-8</sub>, -C(O)R<sub>F-8</sub>, -CO<sub>2</sub>R<sub>F-8</sub>, aryl, R<sub>5</sub>, or R<sub>6</sub>;

$R_{F-4}$  is H, or alkyl;

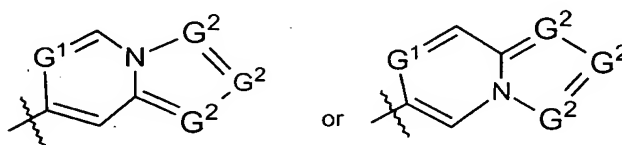
$R_{F-7}$  is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, phenyl, or phenyl having 1 substituent selected from R<sub>9</sub> and  
 10 further having 0-3 substituents independently selected from F, Cl, Br, or I;

$R_{F-8}$  is H, alkyl, substituted alkyl, cycloalkyl, haloalkyl, heterocycloalkyl, substituted heterocycloalkyl, substituted phenyl, or substituted naphthyl;

$R_{F-9}$  is aryl, R<sub>5</sub>, or R<sub>6</sub>;

15

wherein W is (G):



$G^1$  is N or CH;

Each  $G^2$  is N or C(R<sub>G-1</sub>), provided that no more than one  $G^2$  N;

Each R<sub>G-1</sub> is independently H, alkyl, substituted alkyl, haloalkyl, alkenyl, substituted alkenyl, haloalkenyl, alkynyl, substituted alkynyl, haloalkynyl, -CN, -NO<sub>2</sub>,  
 20 F, Br, Cl, I, -C(O)N(R<sub>G-3</sub>)<sub>2</sub>, -N(R<sub>G-3</sub>)<sub>2</sub>, -SR<sub>G-6</sub>, -S(O)<sub>2</sub>R<sub>G-6</sub>, -OR<sub>G-6</sub>, -C(O)R<sub>G-6</sub>, -CO<sub>2</sub>R<sub>G-6</sub>, aryl, R<sub>5</sub>, R<sub>6</sub>, or two R<sub>G-1</sub> on adjacent carbon atoms may combine for W to be a 6-5-6 fused-tricyclic-heteroaromatic-ring system optionally substituted on the  
 25 newly formed ring where valency allows with 1-2 substituents independently selected from F, Cl, Br, I, and R<sub>G-2</sub>;

R<sub>G-2</sub> is alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl, -OR<sub>G-8</sub>, -SR<sub>G-8</sub>,  
 -S(O)<sub>2</sub>R<sub>G-8</sub>, -S(O)R<sub>G-8</sub>, -OS(O)<sub>2</sub>R<sub>G-8</sub>, -N(R<sub>G-8</sub>)<sub>2</sub>, -C(O)R<sub>G-8</sub>, -C(S)R<sub>G-8</sub>, -C(O)OR<sub>G-8</sub>,  
 30 -CN, -C(O)N(R<sub>G-8</sub>)<sub>2</sub>, -NR<sub>G-8</sub>C(O)R<sub>G-8</sub>, -S(O)<sub>2</sub>N(R<sub>G-8</sub>)<sub>2</sub>, -NR<sub>G-8</sub>S(O)<sub>2</sub>R<sub>G-8</sub>, -NO<sub>2</sub>,

-N(R<sub>G-8</sub>)C(O)N(R<sub>G-8</sub>)<sub>2</sub>, substituted alkyl, substituted alkenyl, substituted alkynyl, substituted cycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl, phenyl having 0-4 substituents independently selected from F, Cl, Br, I and R<sub>G-7</sub>, naphthyl, or naphthyl having 0-4 substituents independently selected from F, Cl, Br, I,  
 5 or R<sub>G-7</sub>;

provided that when G<sup>2</sup> adjacent to the bridge N is C(R<sub>G-1</sub>) and the other G<sup>2</sup> are CH, that R<sub>G-1</sub> is other than H, F, Cl, I, alkyl, substituted alkyl or alkynyl;

Each R<sub>G-3</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, alkyl substituted with 1 substituent selected from R<sub>G-4</sub>, cycloalkyl substituted with 1  
 10 substituent selected from R<sub>G-4</sub>, heterocycloalkyl substituted with 1 substituent selected from R<sub>G-4</sub>, haloalkyl, halocycloalkyl, haloheterocycloalkyl, phenyl, or substituted phenyl;

R<sub>G-4</sub> is -OR<sub>G-5</sub>, -SR<sub>G-5</sub>, -N(R<sub>G-5</sub>)<sub>2</sub>, -C(O)R<sub>G-5</sub>, -SOR<sub>G-5</sub>, -SO<sub>2</sub>R<sub>G-5</sub>, -C(O)N(R<sub>G-5</sub>)<sub>2</sub>, -CN, -CF<sub>3</sub>, -NR<sub>G-5</sub>C(O)R<sub>G-5</sub>, -S(O)<sub>2</sub>N(R<sub>G-5</sub>)<sub>2</sub>, -NR<sub>G-5</sub>S(O)<sub>2</sub>R<sub>G-5</sub>, or  
 15 -NO<sub>2</sub>;

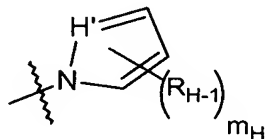
Each R<sub>G-5</sub> is independently H, alkyl, cycloalkyl, heterocycloalkyl, haloalkyl, halocycloalkyl, or haloheterocycloalkyl;

R<sub>G-6</sub> is H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, phenyl, or phenyl having 0-4 substituents independently  
 20 selected from F, Cl, Br, I, and R<sub>G-7</sub>;

R<sub>G-7</sub> is alkyl, substituted alkyl, haloalkyl, -OR<sub>G-5</sub>, -CN, -NO<sub>2</sub>, -N(R<sub>G-3</sub>)<sub>2</sub>;

Each R<sub>G-8</sub> is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, phenyl, or phenyl substituted with 0-4 independently  
 25 selected from F, Cl, Br, I, or R<sub>G-7</sub>;

wherein W is (H)



H' is N or CH;

Each R<sub>H-1</sub> is independently F, Cl, Br, I, -CN, -NO<sub>2</sub>, alkyl, haloalkyl, substituted alkyl, alkenyl, haloalkenyl, substituted alkenyl, alkynyl, haloalkynyl,  
 30

substituted alkynyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, aryl,  $R_5$ ,  $R_6$ ,  $-OR_8$ ,  $-SR_8$ ,  $-SOR_8$ ,  $-SO_2R_8$ ,  $-SCN$ ,  $-S(O)N(R_8)_2$ ,  $-S(O)_2N(R_8)_2$ ,  $-C(O)R_8$ ,  $-C(O)_2R_8$ ,  $-C(O)N(R_8)_2$ ,  $C(R_8)=N-OR_8$ ,  $-NC(O)R_5$ ,  
 5  $-NC(O)R_{H-3}$ ,  $-NC(O)R_6$ ,  $-N(R_8)_2$ ,  $-NR_8C(O)R_8$ ,  $-NR_8S(O)_2R_8$ , or two  $R_{H-1}$  on adjacent carbon atoms may fuse to form a 6-membered ring to give a 5-6 fused, bicyclic moiety where the 6-membered ring is optionally substituted with 1-3 substituents selected from  $R_{H-2}$ ;

$m_H$  is 0, 1, or 2;

10  $R_{H-2}$  is alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, haloalkyl, haloalkenyl, haloalkynyl, halocycloalkyl, haloheterocycloalkyl,  $-OR_{H-3}$ ,  $-SR_{H-3}$ ,  $-S(O)_2R_{H-3}$ ,  $-S(O)R_{H-3}$ ,  $-OS(O)_2R_{H-3}$ ,  $-N(R_{H-3})_2$ ,  $-C(O)R_{H-3}$ ,  $-C(S)R_{H-3}$ ,  $-C(O)OR_{H-3}$ ,  $-CN$ ,  $-C(O)N(R_{H-3})_2$ ,  $-NR_{H-3}C(O)R_{H-3}$ ,  $-S(O)_2N(R_{H-3})_2$ ,  $-NR_{H-3}S(O)_2R_{H-3}$ ,  $-NO_2$ ,  $-N(R_{H-3})C(O)N(R_{H-3})_2$ , substituted alkyl, substituted alkenyl, substituted alkynyl,  
 15 substituted cycloalkyl, substituted heterocycloalkyl, lactam heterocycloalkyl, phenyl, phenyl having 0-4 substituents independently selected from F, Cl, Br, I and  $R_7$ , naphthyl, naphthyl having 0-4 substituents independently selected from F, Cl, Br, I, or  $R_7$ , or two  $R_{H-2}$  on adjacent carbon atoms may combine to form a three-ring-fused-5-6-6 system optionally substituted with up to 3 substituents independently selected  
 20 from Br, Cl, F, I,  $-CN$ ,  $-NO_2$ ,  $-CF_3$ ,  $-N(R_{H-3})_2$ ,  $-N(R_{H-3})C(O)R_{H-3}$ , alkyl, alkenyl, and alkynyl;

Each  $R_{H-3}$  is independently H, alkyl, haloalkyl, substituted alkyl, cycloalkyl, halocycloalkyl, substituted cycloalkyl, heterocycloalkyl, haloheterocycloalkyl, substituted heterocycloalkyl, phenyl, or phenyl substituted with 0-4 independently  
 25 selected from F, Cl, Br, I, or  $R_7$ ;

or pharmaceutical composition, pharmaceutically acceptable salt, racemic mixture, or pure enantiomer thereof.

18. The composition of claim 17, wherein X is O,  $R_1$  is H,  $R_2$  is absent,  $R_{2-3}$  is H,  
 30 each  $R_3$  is H,  $R_4$  is H and W is 4-chlorobenz-1-yl; dibenzo[b,d]thiophene-2-yl; isoquinoline-3-yl; furo[2,3-c]pyridine-5-yl; 1,3-benzodioxole-5-yl; 2,3-dihydro-1,4-benzodioxine-6-yl; 1,3-benzoxazole-5-yl; thieno[2,3-c]pyridine-5-yl; thieno[3,2-c]pyridine-6-yl; [1]benzothieno[3,2-c]pyridine-3-yl; 1,3-benzothiazole-6-yl;

thieno[3,4-c]pyridine-6-yl; 2,3-dihydro-1-benzofuran-5-yl; 1-benzofuran-5-yl;  
 furo[3,2-c]pyridine-6-yl; [1]benzothieno[2,3-c]pyridine-3-yl; dibenzo[b,d]furan-2-yl;  
 1-benzofuran-6-yl; 2-naphthyl; 1H-indole-6-yl; pyrrolo[1,2-c]pyrimidine-3-yl; 1-  
 benzothiophene-5-yl; 1-benzothiophene-5-yl; 1-benzothiophene-6-yl; pyrrolo[1,2-  
 5 a]pyrazine-3-yl; 1H-indole-6-yl; pyrazino[1,2-a]indole-3-yl; 1,3-benzothiazole-6-yl;  
 [1]benzofuro[2,3-c]pyridine-3-yl; [1]benzofuro[2,3-c]pyridine-3-yl; 2H-chromene-6-  
 yl; indolizine-6-yl; and [1,3]dioxolo[4,5-c]pyridine-6-yl; any of which is optionally  
 substituted as allowed in claim 17.

- 10 19. The composition of claim 18, wherein the agonist is  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-4-chlorobenzamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]dibenzo[b,d]thiophene-2-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]isoquinoline-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 15 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2,3-dihydro-1,4-benzodioxine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]isoquinoline-3-carboxamide;  
 20 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-methylfuro[2,3-c]pyridine-5-  
 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzoxazole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1,3-benzoxazole-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 25 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-isopropylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 30 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 5-{[(2R)-7-azoniabicyclo[2.2.1]hept-2-ylamino]carbonyl}-3-ethylfuro[2,3-c]pyridin-  
 6-ium dichloride;

- 5-([(2R)-7-azoniabicyclo[2.2.1]hept-2-ylamino]carbonyl)-3-isopropylfuro[2,3-c]pyridin-6-ium dichloride;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]furo[2,3-c]pyridine-5-carboxamide;
- N-1-azabicyclo[2.2.2]oct-3-yl[1]benzothieno[3,2-c]pyridine-3-carboxamide;
- 5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;
- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-chlorofuro[2,3-c]pyridine-5-carboxamide;
- N-1-azabicyclo[2.2.2]oct-3-ylfuro[2,3-c]pyridine-5-carboxamide;
- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,4-c]pyridine-6-carboxamide;
- N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;
- 10 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-methylfuro[2,3-c]pyridine-5-carboxamide;
- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2,3-dihydro-1-benzofuran-5-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]thieno[2,3-c]pyridine-5-carboxamide;
- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;
- 15 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]furo[3,2-c]pyridine-6-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]thieno[3,2-c]pyridine-6-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-ethylfuro[2,3-c]pyridine-5-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-isopropylfuro[2,3-c]pyridine-5-carboxamide;
- 20 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-chlorofuro[2,3-c]pyridine-5-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]3-chlorofuro[2,3-c]pyridine-5-carboxamide;
- N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;
- N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-4-chlorobenzamide;
- 25 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]thieno[3,4-c]pyridine-6-carboxamide;
- N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]dibenzo[b,d]thiophene-2-carboxamide;
- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzofuran-5-carboxamide;
- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1]benzothieno[2,3-c]pyridine-3-carboxamide;
- N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1]benzothieno[2,3-c]pyridine-3-
- 30 carboxamide;
- N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-1-benzofuran-5-carboxamide;
- N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]dibenzo[b,d]furan-2-carboxamide;
- N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;

- N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromofuro[2,3-c]pyridine-5-  
 5 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-2-naphthamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]thieno[2,3-c]pyridine-5-carboxamide;  
 10 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]thieno[3,2-c]pyridine-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1H-indole-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]thieno[2,3-c]pyridine-5-  
 carboxamide;  
 15 3-methyl-N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-  
 carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]thieno[3,2-c]pyridine-6-  
 carboxamide;  
 20 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-  
 carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-5-carboxamide;  
 25 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]pyrrolo[1,2-c]pyrimidine-3-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-bromofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromo-1-benzofuran-5-carboxamide;  
 30 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromo-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-bromothieno[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-bromothieno[2,3-c]pyridine-5-  
 carboxamide;

- N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzothiophene-5-carboxamide;  
 N-[(3S)-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-methyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-methyl-1-benzofuran-5-carboxamide;  
 5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1-benzofuran-6-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1-benzofuran-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-6-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzothiophene-6-carboxamide;  
 10 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-1-benzothiophene-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1-methyl-1H-indole-6-carboxamide;  
 N-[(3S)-1-azabicyclo[2.2.2]oct-3-yl]-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-isopropyl-1-benzofuran-5-carboxamide;  
 15 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-isopropyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethynylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1H-indazole-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-methyl-1-benzofuran-5-carboxamide;  
 20 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-2-methyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]pyrazino[1,2-a]indole-3-carboxamide;  
 3-bromo-N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]furo[2,3-c]pyridine-5-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 25 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-7-methoxy-2-naphthamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R,5R)-1-azabicyclo[3.2.1]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl]-3-bromo-1-benzofuran-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1]benzofuro[2,3-c]pyridine-3-carboxamide;  
 30 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1]benzofuro[2,3-c]pyridine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethynyl-1-benzofuran-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-ethynyl-1-benzofuran-5-carboxamide;

- N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2H-chromene-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-prop-1-ynyl-1-benzofuran-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-phenyl-1,3-benzodioxole-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-bromopyrrolo[1,2-a]pyrazine-3-carboxamide;  
 5 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-prop-1-ynylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]pyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]indolizine-6-carboxamide;  
 10 2-amino-N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-1,3-benzothiazole-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-ethynylpyrrolo[1,2-a]pyrazine-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-8-methoxy-2-naphthamide;  
 N-[(2S,3R)-2-methyl-1-azabicyclo[2.2.2]oct-3-yl]indolizine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl][1,3]dioxolo[4,5-c]pyridine-6-carboxamide;  
 15 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl][1,3]dioxolo[4,5-c]pyridine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-cyano-1-benzofuran-5-carboxamide;  
 N-[(3R,4S)-1-azabicyclo[2.2.1]hept-3-yl][1,3]dioxolo[4,5-c]pyridine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-  
 20 carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-7-hydroxy-2-naphthamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-3-ethynylfuro[2,3-c]pyridine-5-carboxamide;  
 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-6-chloroisoquinoline-3-carboxamide;  
 25 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-ethyl-2,3-dihydro-1,4-benzodioxine-6-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-6-methylisoquinoline-3-carboxamide;  
 30 N-[(1S,2R,4R)-7-azabicyclo[2.2.1]hept-2-yl]-6-methylisoquinoline-3-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-3-cyanofuro[2,3-c]pyridine-5-carboxamide;  
 N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]-2-naphthamide; and

N-[(3R)-1-azabicyclo[2.2.2]oct-3-yl]dibenzo[b,d]furan-2-carboxamide, provided that the agonist is a free base or a pharmaceutically acceptable salt thereof.

20. The composition of claim 19, wherein the Acetylcholinesterase inhibitor is
- 5 physostigmine, aricept, rivastigamine, galantamine, monoamine acridines and derivatives, piperidinyl-alkanoyl heterocyclic compounds, N-benzyl-piperidine derivatives, 4-(1-benzylpiperidyl)-substituted fused quinoline derivatives, and cyclic amide derivatives.